REPORT DOCUMENTATION PAGE

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Final Report: 3D Data Acquisition Platform for Human Activity Understanding

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6. AUTHORS
Yun Fu

5d. PROJECT NUMBER

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14. ABSTRACT
In this project, we incorporated motion capture devices, 3D vision sensors, and EMG sensors to cross validate multimodality data acquisition, and address fundamental research problems of representation and invariant description of
3D data, human motion modeling and applications of human activity analysis, and computational optimization of large-scale 3D data. The support for the acquisition of such research instrumentation have significantly facilitated our current and future research and educate scientists and engineers in areas important to national defense and the

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Data Acquisition, Human Activity Understanding

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Yun Fu
UU	UU	UU	UU		19b. TELEPHONE NUMBER 617-373-7328

Report Title

Final Report: 3D Data Acquisition Platform for Human Activity Understanding

ABSTRACT

In this project, we incorporated motion capture devices, 3D vision sensors, and EMG sensors to cross validate multimodality data acquisition, and address fundamental research problems of representation and invariant description of
3D data, human motion modeling and applications of human activity analysis, and computational optimization of large-scale 3D data. The support for the acquisition of such research instrumentation have significantly facilitated
our current and future research and educate scientists and engineers in areas important to national defense and the DoD's mission.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 0.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received		Book
03/02/2016	1.00	Yun Fu . Human Activity Recognition and Prediction, Switzerland: Springer International Publishing, (01 2016)

TOTAL: **1**

Received	Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Dr. Fu was elected as a member of Global Young Academy.

Dr. Fu was recognized by the IEEE Computational Intelligence Society (CIS) as the awardee of 2016 IEEE CIS Outstanding Early Career Award, for contributions to neural computing, manifold learning, and visual intelligence.

Dr. Fu was selected as one of the 2015 National Academy of Engineering US Frontiers of Engineering by NAE.

Dr. Fu was elected to be Senior Member of ACM.

Dr. Fu received 2016 Adobe Faculty Research Awards.

Dr. Fu was promoted to the rank of Associate Professor with Tenure.

Former Ph.D. student Li, Kang's dissertation entitled “Video event recognition and prediction based on temporal structure analysis” has been featured by IEEE Signal Processing society eNews in the year 2015 at http://www.signalprocessingsociety.org/newsletter/category/ph-d-theses/page/11/.

Students Shuyang Wang, Shuhui Jiang, Ming Shao, Zhengming Ding, Handong Zhao and Hongfu Liu received the AAAI Student Travel Award for AAAI 2016

Student Sheng Li, receives the 2015 Chi-nese Gov-ern-ment Award for Out-standing Self-??Financed Stu-dents Abroad.

Student Sheng Li received the 2015 NEU Outstanding Graduate Student Award (Topmost student award in NEU)

Student Sheng Li received the ACM SIGIR Travel Award for CIKM 15.

Students Handong Zhao and Hongfu Liu received the ICDM Student Travel Award for ICDM 2015

Graduate Students

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

NAME	PERCENT_SUPPORTED
Yu Kong	0.00
FTE Equivalent:	**0.00**
Total Number:	**1**

Names of Faculty Supported

NAME	PERCENT_SUPPORTED	National Academy Member
Yun Fu	0.00	
FTE Equivalent:	**0.00**	
Total Number:	**1**	

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period:	0.00
The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:.....	0.00
The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:.....	0.00
Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):.....	0.00
Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:.....	0.00
The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense	0.00
The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:	0.00

Names of Personnel receiving masters degrees

NAME
Total Number:

Names of personnel receiving PHDs

NAME
Kang Li
Total Number: 1

Names of other research staff

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

We have used this DURIP award to facilitate our 3D Data Acquisition Platform. We have acquired major instruments such as Vicon MX-T40S camera system, 192 cores of HPC computational equipment, and Trigno Wireless EMG system with 16 Trigno EMG+XYZ sensors from Delsys. Current platform is sufficient to incorporate both motion capture devices and 3D vision sensors to cross validate multimodality data acquisition, and address fundamental research problems of representation and invariant description of 3D data, human motion modeling and applications of human activity analysis, and computational optimization of large-scale 3D data. The support for the acquisition of such equipment has significantly facilitated our current research and educate scientists and engineers in areas important to national defense. We are using this platform to collecting a unique database which could be used for multimodality sensor fusion for human motion analysis, action recognition, and behavior understanding. The impact of this award will last long as the new facility is transforming our current research scope and in the meanwhile help our current and future technology transfer.

Technology Transfer